Teen Birth Rate Hot Spots in California, 1999-2000:
A Resource Developed Using a Geographic Information Systems Approach

California Department of Health Services
Maternal and Child Health Branch
Epidemiology and Evaluation Section

2001

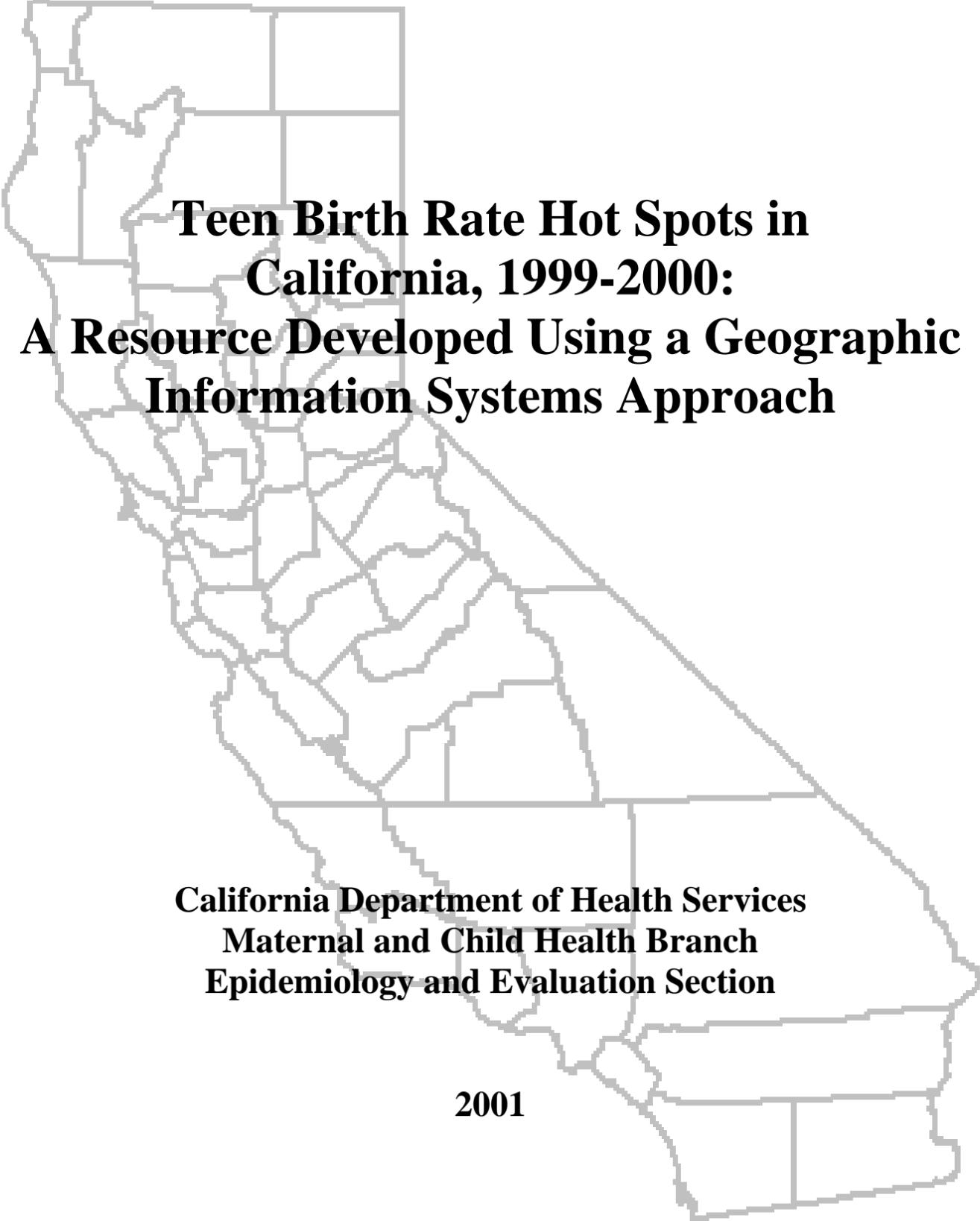Carrie J. Florez, BSW
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Purpose:

The purpose of this study is to identify geographic areas, census tracts, which have teen birth rates that are statistically significantly higher than the State rate. Presenting the data geographically allows users to identify elevated teen birth rates at the census tract level. This information may be used as a tool in targeting interventions in specific areas.

Methods:

The methodology used in the present study consists of several steps: first, data for the number of births to California resident females, aged 15 through 19 years (n=112,178) were derived from the California Automated Vital Statistics System (AVSS) for the years 1999 and 2000. The AVSS is appropriate for small area geographic analyses, as it contains the mother's full residential address. Using MapMarker 7.0, each birth record was geocoded (i.e., the longitude and latitude coordinates of the mother's address were identified). Approximately 92 percent of the records (n=103,249) were geocoded to acceptable levels (defined as either the exact address or the zipcode+4 centroid). Using MapInfo 6.5, California census tract boundaries established for the year 2000 were imposed on the geocoded records, therein providing the count of births within each census tract. These residentially geocoded (by census tract) live births, born to California resident females, aged 15 through 19 years, during the years 1999 and 2000, as recoded in the AVSS, comprise the numerator file.

Next, population data were obtained from the United States Census Bureau (2001). Specifically, these population data, which comprise the denominator file, were census tract-specific counts of females, aged 15 through 19 years, who resided in California during 2000.

Further, using the SAS System, the numerator and the denominator files were merged by the mother's county and census tract of residence (n=7,049), in order to compute 1999-2000 teen birth rates for each census tract and a summary rate for the State. Since there are two years of numerator data, each rate is calculated as the ratio of the area-specific numerator and twice the area-specific denominator times 1,000. In 661 census tracts (9.4%), no teen births occurred, and in 1 tract (0.01%), there was one birth but no census tract-specific resident females, aged 15 through 19 years. Once calculated, each census tract-specific rate was assessed for stability, and each stable rate was tested for statistical significance, relative to the State rate, as described below.

For each census tract for which both a numerator and a denominator were available, the Relative Standard Error (RSE), a measure of stability defined as 100 times the quotient of the Standard Error and the Rate, was calculated. Consistent with California Department of Health Services, Center for Health Statistics' standard, any census tract with an RSE equal to or greater than 23 percent was considered unstable and, therefore, excluded from statistical testing. This criterion excluded 4,310 (61.1%) census tracts.

Lastly, for each of the remaining 2,077 census tracts (29.5%), a determination was made as to the statistical significance of difference between the tract rate and the State rate. This determination was made as follows: first, the State rate (43.8 births per 1,000 California resident females, aged 15 through 19 years) was treated as a constant. Next, using the formula described by Newcombe (1998) and derived from Wilson (1927), a 95% confidence interval (CI) was placed around each census tract rate. If the State rate was found to reside within the tract-specific 95% CI, then the census tract rate was not statistically significantly lower or higher than the State

rate. However, if the State rate was found to reside outside of the tract-specific CI, then the two rates were considered to be statistically significantly different from each other. Finally, only those census-tract rates that were observed to be statistically significantly different and higher than the State rate were highlighted. These tracts are referred to as "hot spots" and are shown on the following maps as gray.

The following table lists the "hot spot" census tracts by county of location. The table contains the census tract number, the numerator (number of births to females aged 15 through 19 years) for 1999 and 2000, twice the 2000 denominator (number of females aged 15 through 19 years residing in the census tract), and the 1999-2000 teen birth rate. Because the census tract numbers are neither informative nor intuitive, it is not possible to know the specific area to which a census tract number refers simply with the materials provided in this resource document. However, it is possible to ascertain such information via other data sources. In order to identify the exact geographic location of the census tracts identified as "hot spots," given only the census tract number, readers with Internet access can visit the following website, which displays census tract maps for each county in California: http://ftp2.census.gov/plmap/pl_trt/st06_California/.

The following maps display an overview for each county; moreover, for those counties with "hot spots," additional maps providing greater detail are provided. All maps include county boundaries, census tract boundaries, and cities. Maps of the "hot spots" within a county contain both county and census tract boundaries, along with freeways, highways, and schools. The data on the schools were obtained from the California Department of Education. These data include all schools in California as of October 4, 2001. Schools that were not plotted on the maps were elementary, intermediate, and middle schools because the study population has already aged out of these institutions.

References:

Census 2000 Summary File 1 [California]/prepared by the U.S. Census Bureau, 2001.

Newcombe, Robert G. (1998). "Two-Sided Confidence Intervals for the Single Proportion: Comparison of Seven Methods," *Statistics in Medicine,* 17, 857-872.

Wilson, E. B. (1927). "Probable Inference, the Law of Succession, and Statistical Inference," *Journal of the American Statistical Association,* 22, 209-212.